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STUDENT A

Algebra 1 Test
Exponents

Name: _____

In examples 1 - 7, simplify the expressions completely.

1. $x^2 \cdot x^3 \cdot x^5$

2. $(3x^3)^2 \cdot 9x^6$

~~3~~ $3^5 \cdot 3^5 \cdot 3^{10}$
 $3^0 = 1$

ADD EXPONENTS
WHEN MULTIPLYING
TWO POWERS THAT
HAVE THE SAME
BASE.

~~4~~ $\frac{8a^3b^4}{6a^2b^6}$

Divide then
subtract
exponents.

5. $(\frac{3}{4})^2 = \frac{9}{16}$
 $\frac{3^2}{4^2} = \frac{9}{16}$

12. $\frac{3x^2y^4}{4x^3y^3} \cdot \frac{2x^4y^2}{4x^3y}$

$\frac{6x^6y^6}{16x^6y^4}$
 $= \frac{3}{8}x^2$

SIMPLIFY
COMPLETELY

2. $\frac{-2xy^3}{3x^2y^2} \cdot \frac{4x^3y^4}{8x^3y^3} = \frac{-8x^6y^7}{24x^6y^5} = \frac{-1}{3}x^2$

SIMPLIFY COMPLETELY

Rewrite the scientific notation in decimal form.

2. $6.56 \times 10^{-4} = .000656$

b. $7.4 \times 10^5 = 740,000$

WHAT
IS THIS.

Rewrite the decimal in scientific notation.

9a. $4,000,000 = 4 \times 10^6$

b. $.08934 = 8.934 \times 10^{-2}$

10. The United States had a land area of 3.54×10^6 square miles. In 2000, the population of the United States was 2.9×10^8 . What was the population density (people per square mile) of the United States in 2000?

PEOPLE PER SQUARE MILE = $\frac{2.9 \times 10^8}{3.54 \times 10^6} = \frac{3.54 \times 10^6}{2.9 \times 10^8} = 1.22 \times 10^{-2}$ PER SQUARE MILE

11. In 2001, 1.5×10^5 United States companies spent 9.3×10^{10} dollars on research and development. What was the average amount per company spent on research and development?

\$ AMOUNT PER COMPANY = $\frac{9.3 \times 10^{10}}{1.5 \times 10^5} = \frac{1.5 \times 10^5}{9.3 \times 10^{10}} = 1.61 \times 10^{-5}$
 $= \$620,000$

12. Which option gives the greater ending balance?

a. Put \$1000 in an account that pays 6% interest compounded monthly for 10 years.

$$1000 \left(1 + \frac{0.06}{12}\right)^{120} = 1919.40$$

b. Put \$1500 in an account that pays 5% interest compounded quarterly for 10 years.

$$1500 \left(1 + \frac{0.05}{4}\right)^{40} = 2470.51$$

(A) (B) It is more \$.

$$1500 \left(1 + \frac{0.05}{4}\right)^{40} = 2465.43$$

Exponential growth every

13. Mike just graduated middle school and decides to put \$2000 in a savings account at Fleet bank. The bank is paying 6% interest compounded monthly. If Mike leaves the money untouched until he graduates from UCONN, how much will he have in the account? Will he have enough money saved to buy a new Nissan Pathfinder, and explain why or why not?

$$2000 \left(1 + \frac{0.06}{12}\right)^{60} = 3238.29$$

NISSAN YES/NO? NO, IT COSTS AT LEAST \$20,000.

14. In 2000, you bought a new car for \$30,000. Each year the value of the car decreased by 15%. What will be the value of the car in 2004?

$$30,000 (0.85)^4 = 15,660.19$$

15. A business earned 85,000 in 1995. Then its earnings decreased by 4% each year for 6 years. Write an exponential decay equation for the earnings, y, in year x. Then determine how much the business earned in 2001.

$$85,000 (0.96)^6 = 66,534.41$$

The annual NBA (National Basketball Association) earnings are given in the table. The earnings consist of ticket sales, television contracts, merchandise sales and other profitable gains. Investigate whether this data can be modeled by an exponential function.

Year	Year #	NBA Earnings
1989	1	87 million
1990	2	88 million
1991	3	90 million
1992	4	93 million
1993	5	95 million
1994	6	98 million
1995	7	102 million
1996	8	118 million
1997	9	129 million
1998	10	142 million
1999	11	156 million
2000	12	170 million
2001	13	190 million

16. Enter the data in you calculator, choose an appropriate window and make a scatter plot. Write the window settings below.

X min- -10
 X max- 20
 X scale- 10
 Y min- -10
 Y max- 200
 Y scale- 1

17. Do an exponential regression to find an equation that best represents your data. Write the equation below.

$$Y = 12.21 \cdot 1.07^x$$

18. What do the first and second numbers in your equation represent? the 1st number is my starting amt. and number is my change factor.

19. Use the equation to predict the NBA earnings for 2002? 2004?

2002 - 186.20
 - 2004 - 213.18

20. Once you have found an equation that represents your data, explain the three ways in which you can use the graphing calculator to predict future events/outcomes. For example, the three ways you can answer question #19

You can go to your table. ② You can hit trace and type in the number. ③ Follow the line (regression) on the graph.